# IECEx Certificate of Conformity

## INTERNATIONAL ELECTROTECHNICAL COMMISSION
## IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.: IECEx CML 15.0034X

Issue No: 2

Certificate history:
Issue No. 2 (2017-10-20)
Issue No. 1 (2016-01-13)
Issue No. 0 (2015-07-23)



Status: **Current**

Date of Issue: **2017-10-20**

Applicant: **Controlled Systems Limited**
Ryder Close,
Swadlincote,
Derbyshire.
DE11 9EU
**United Kingdom**

Equipment: **949X-PS XXX-IS Power Supply Module**

*Optional accessory:*

Type of Protection: **Intrinsic safety and/or Type n**

Marking:

[Ex ia Ma] I, [Ex ib Mb] I, [Ex ia Ga] II*, [Ex ib Gb] IIB, [Ex ia Da] IIIC, [Ex ib Db] IIIC

Ex nA II* T4 Gc
* = IIA or IIB or IIC depending on model

(-40°C < Ta < +70°C)

*Approved for issue on behalf of the IECEx Certification Body:* A Snowdon

*Position:* Certification Officer

*Signature:*
*(for printed version)*

*Date:* October 20, 2017

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by:

# IECEx Certificate of Conformity

Certificate No: IECEx CML 15.0034X Issue No: 2

Date of Issue: 2017-10-20



Certification Management Limited
Unit 1, Newport Business Park
New Port Road
Ellesmere Port
CH65 4LZ
United Kingdom

# IECEx Certificate of Conformity

| | | |
|---|---|---|
| Certificate No: | IECEx CML 15.0034X | Issue No: 2 |
| Date of Issue: | **2017-10-20** | Page 3 of 5 |
| Manufacturer: | **Controlled Systems Limited**<br>Ryder Close,<br>Swadlincote,<br>Derbyshire.<br>DE11 9EU<br>**United Kingdom** | |

Additional Manufacturing location(s):

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

**STANDARDS:**

The electrical apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

| | |
|---|---|
| **IEC 60079-0 : 2011**<br>Edition:6.0 | Explosive atmospheres - Part 0: General requirements |
| **IEC 60079-11 : 2011**<br>Edition:6.0 | Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i" |
| **IEC 60079-15 : 2010**<br>Edition:4 | Explosive atmospheres - Part 15: Equipment protection by type of protection "n" |

*This Certificate **does not** indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.*

**TEST & ASSESSMENT REPORTS:**

*A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in*

Test Report:

GB/CML/ExTR15.0047/00 GB/CML/ExTR17.0175/00

Quality Assessment Report:

GB/SIR/QAR07.0023/10

# IECEx Certificate of Conformity

Certificate No: IECEx CML 15.0034X Issue No: 2

Date of Issue: 2017-10-20 Page 4 of 5

**Schedule**

**EQUIPMENT:**

*Equipment and systems covered by this certificate are as follows:*

| |
|---|
| The 949X-PS-XXXX IS Power Supply Module series is an intrinsically safe power supply intended to power equipment in the hazardous area. |
| |
| **See Annex for full description and Conditions of Manufacture** |

**SPECIFIC CONDITIONS OF USE: YES as shown below:**

**See Annex for Conditions of Certification**

# IECEx Certificate of Conformity

Certificate No: IECEx CML 15.0034X Issue No: 2

Date of Issue: **2017-10-20** 

**DETAILS OF CERTIFICATE CHANGES (for issues 1 and above):**

**Issue 1**

1. To correct certificate code and ambient range.

**Issue 2**

1. To rename the printed circuit board from the 9491-PS-PLUS (rev 6) to the 9492-PS-PLUS (Rev 7).

2. To permit the use of an alternative opto-isolator Type CN65Exi, in place of the original OPI1264C. Changes to the PCB have been made to accommodate the new opto-isolator.

3. To permit the use of an alternative version of IC4 and IC5 (LTC4252), together with changes in value of R16; R18 and R9; R24. Resistors R17 and R23 have been removed as they are no longer required.

4. To provide additional placement of up to ten resistor slots (R37 to R41 and R63 to R67) for the creation of the Ex ia circuit. This arrangement allows the flexibility of creating the correct value of current limiting resistance, whilst allowing for the failure of two resistors.

5. To permit the value of decoupling capacitors C52 and C53 to be increased to 10nF.

6. To permit gate resistors R29 and R31 to be duplicated to R29; R17 and R31; R23. In addition, the values of R30 and R32 have been increased.

7. Removal of standard IEC 60079-26:2014 as there is no longer a requirement to meet this for the equipment considered.

**Annex:**

Certificate Annex IECEx 15_0034X Iss. 2.pdf

| | |
|---|---|
| **Annexe to:** | IECEx CML 15.0034X Issue 2 |
| **Applicant:** | Controlled Systems Limited |
| **Apparatus:** | 949X-PS-XXXX IS Power Supply Module |

## Description of Equipment

The 949X-PS-XXXX IS Power Supply Module series is an intrinsically safe power supply intended to power equipment in the hazardous area. It consists of a printed circuit board assembly mounted in a plastic enclosure. There can be two separate intrinsically safe outputs, one 'ia' and one 'ib'. It restricts the transfer of energy from unspecified safe-area apparatus to an intrinsically safe circuit by the limitation of voltage and current. A transformer provides galvanic isolation between the hazardous and non-hazardous area

The power supply is intended to be either DIN rail mounted or backplane mounted.

External I.S. connections are made via 'plug-in' terminals at the top of the enclosure, one for each of the two separate I.S. circuits (if fitted).

External non-I.S. connections are made via either 'plug-in' terminals at the side of the enclosure when the power supply is DIN rail mounted, or via a connector at the bottom of the enclosure when the equipment is backplane mounted.

The equipment must either only be installed in clean, dry, well-ventilated environments or fitted in an additional enclosure that has an IP rating suitable for the environment of use.

The power supply has the following options:

1. ia and ib outputs, which includes the 9491-PS and the 9492- PS-Plus (Group IIB, IIIC and Mining)
2. ia only outputs, which includes the 9493-PS-XXX where:
    a. 9493-PS-Mxx (Group I mining)
    b. 9493-PS-Axx (Group IIA)
    c. 9493-PS-Bxx (Group IIB)
    d. 9493-PS-Cxx (Group IIC)

The 949X-PS-XXXX IS Power Supply Module electrical parameters are:

Um = 250V

The circuit connected to the safe area terminals is designed to operate from a d.c. supply voltage of up to 30V.

| Part Number | Group | LOP | Nominal O/P Voltage | Uo (OVP) | Io | Po |
|---|---|---|---|---|---|---|
| 9491-PS | IIB | ia<br>ib | 10.0V … 12.2V | 12.4V | 2.61A or 505mA | 8.09W or 6.27W |
| 9492-PS-PLUS | IIB | ia<br>ib | 10.0V … 12.6V | 12.8V | 3.23A or 630mA | 10.34W or 8.07W |
| 9493-PS-C5 | IIC | ia | 4.8V … 5.2V | 5.4V | 4.01A | 5.41W |

Unit 1, Newport Business Park
New Port Road
Ellesmere Port
CH65 4LZ

T +44 (0) 151 559 1160
E info@cmlex.com

www.cmlex.com

Company Reg No. 8554022 VAT No. GB163023642

| Part Number | Group | LOP | Nominal O/P Voltage | Uo (OVP) | Io | Po |
|---|---|---|---|---|---|---|
| 9493-PS-B5 | IIB | ia | 4.8V … 5.2V | 5.4V | 8.26A | 11.16W |
| 9493-PS-C6 | IIC | ia | 5.7V … 6.7V | 7.0V | 3.21A | 5.62W |
| 9493-PS-C7 | IIC | ia | 6.6V … 7.7V | 8.0V | 3.11A | 6.22W |
| 9493-PS-C8 | IIC | ia | 7.6V … 8.7V | 9.0V | 3.03A | 6.82W |
| 9493-PS-C9 | IIC | ia | 8.4V … 9.7V | 10.0V | 2.81A | 7.01W |
| 9493-PS-C10 | IIC | ia | 9.1V … 10.7V | 11.0V | 2.53A | 6.94W |
| 9493-PS-C11 | IIC | ia | 9.9V … 11.7V | 12.0V | 2.25A | 6.73W |
| 9493-PS-C12 | IIC | ia | 10.8V … 12.7V | 13.0V | 1.99A | 6.47W |
| 9493-PS-C13 | IIC | ia | 11.3V … 13.7V | 14.0V | 1.14A | 3.99W |
| 9493-PS-B13 | IIB | ia | 11.3V … 13.7V | 14.0V | 2.62A | 9.17W |
| 9493-PS-A13 | IIA | ia | 11.3V … 13.7V | 14.0V | 3.21A | 11.25W |
| 9493-PS-C14 | IIC | ia | 12.4V … 14.7V | 15.0V | 0.83A | 3.12W |
| 9493-PS-B14 | IIB | ia | 12.4V … 14.7V | 15.0V | 2.10A | 7.89W |
| 9493-PS-A14 | IIA | ia | 12.4V … 14.7V | 15.0V | 2.81A | 10.52W |
| 9493-PS-M14 | I | ia | 12.4V … 14.7V | 15.0V | 3.16A | 11.84W |
| 9493-PS-C15 | IIC | ia | 13.2V … 15.7V | 16.0V | 0.67A | 2.69W |
| 9493-PS-B15 | IIB | ia | 13.2V … 15.7V | 16.0V | 1.58A | 6.34W |
| 9493-PS-A15 | IIA | ia | 13.2V … 15.7V | 16.0V | 2.24A | 8.98W |
| 9493-PS-M15 | I | ia | 13.2V … 15.7V | 16.0V | 2.99A | 11.97W |
| 9493-PS-C16 | IIC | ia | 14.1V … 16.7V | 17.0V | 0.48A | 2.03W |
| 9493-PS-B16 | IIB | ia | 14.1V … 16.7V | 17.0V | 1.26A | 5.37W |
| 9493-PS-A16 | IIA | ia | 14.1V … 16.7V | 17.0V | 1.83A | 7.76W |
| 9493-PS-M16 | I | ia | 14.1V … 16.7V | 17.0V | 2.20A | 9.36W |
| 9493-PS-C17 | IIC | ia | 15.0V … 17.7V | 18.0V | 0.41A | 1.86W |
| 9493-PS-B17 | IIB | ia | 15.0V … 17.7V | 18.0V | 1.11A | 4.99W |
| 9493-PS-A17 | IIA | ia | 15.0V … 17.7V | 18.0V | 1.47A | 6.60W |
| 9493-PS-M17 | I | ia | 15.0V … 17.7V | 18.0V | 1.93A | 8.70W |

The capacitance and the resistance ratio (L/R) of the load connected to the output terminals must not exceed the following values, when used as Ex ia:

| Type | Group | Co | Lo/Ro |
|---|---|---|---|
| | | (uF) | (uH/Ω) |
| 9491-PS | IIB | 7.9 | 17.2 |
| | IIA | 30 | 34.4 |
| | I | 34 | 56.4 |
| 9492-PLUS | IIB | 6.8 | 13.8 |
| | IIA | 24.2 | 27.5 |
| | I | 30 | 45.1 |
| 9493-PS-C5 | IIC | 65 | 6.6 |
| 9493-PS-B5 | IIB | 1000 | 12.7 |
| | IIA | 1000 | 25.5 |
| | I | 1000 | 41.8 |
| 9493-PS-C6 | IIC | 15.7 | 6.3 |
| | IIB | 300 | 25.3 |
| | IIA | 1000 | 50.6 |
| | I | 1000 | 83.0 |
| 9493-PS-C7 | IIC | 8.4 | 5.7 |
| | IIB | 100 | 22.9 |
| | IIA | 1000 | 45.8 |
| | I | 1000 | 75.1 |
| 9493-PS-C8 | IIC | 4.9 | 5.2 |
| | IIB | 40 | 20.9 |
| | IIA | 500 | 41.7 |
| | I | 1000 | 68.4 |
| 9493-PS-C9 | IIC | 3 | 5.1 |
| | IIB | 20 | 20.3 |
| | IIA | 100 | 40.6 |
| | I | 180 | 66.5 |
| 9493-PS-C10 | IIC | 1.97 | 5.1 |
| | IIB | 13.8 | 20.5 |
| | IIA | 60 | 41 |
| | I | 67.5 | 67.2 |
| 9493-PS-C11 | IIC | 1.41 | 5.3 |
| | IIB | 9 | 21.1 |
| | IIA | 36 | 42.2 |
| | I | 38 | 69.5 |
| 9493-PS-C12 | IIC | 1 | 5.5 |
| | IIB | 6.2 | 22.0 |
| | IIA | 22.5 | 44.0 |
| | I | 28.5 | 72.2 |
| 9493-PS-C13 | IIC | 0.73 | 8.9 |
| 9493-PS-B13 | IIB | 4.6 | 15.5 |
| 9493-PS-A13 | IIA | 17 | 25.3 |
| 9493-PS-C14 | IIC | 0.58 | 11.4 |
| 9493-PS-B14 | IIB | 3.55 | 18.0 |
| 9493-PS-A14 | IIA | 14 | 27.0 |
| 9493-PS-M14 | I | 17.8 | 39.4 |
| 9493-PS-C15 | IIC | 0.46 | 13.2 |
| 9493-PS-B15 | IIB | 2.75 | 22.4 |
| 9493-PS-A15 | IIA | 11 | 31.7 |
| 9493-PS-M15 | I | 15.2 | 39.0 |
| 9493-PS-C16 | IIC | 0.375 | 17.5 |
| 9493-PS-B16 | IIB | 2.2 | 26.5 |
| 9493-PS-A16 | IIA | 9 | 36.6 |

| Type | Group | Co | Lo/Ro |
|---|---|---|---|
| | | (uF) | (uH/Ω) |
| 9493-PS-M16 | I | 12.64 | 49.9 |
| 9493-PS-C17 | IIC | 0.309 | 19.1 |
| 9493-PS-B17 | IIB | 1.780 | 28.5 |
| 9493-PS-A17 | IIA | 7.6 | 43.1 |
| 9493-PS-M17 | I | 10 | 53.6 |

The capacitance and the inductance of the load connected to the output terminals must not exceed the following values, when used as Ex ib:

| Type | Group | Co | Lo |
|---|---|---|---|
| | | (µF) | (µH) |
| 9491-PS | IIB | 0.5 | 100 |
| 9492-PLUS | IIB | 1.0 | 100 |

**Conditions of Manufacture**

The following are conditions of manufacture

i. As required by Clause 11.2 of EN/IEC 60079-11:2011, a voltage of 1500Vrms shall be applied for at least 60 seconds (alternatively 1800Vrms for >1sec) between:

- The primary and secondary (1) windings
- The primary and secondary (2) windings
- The secondary (1) and secondary (2) windings

ii. The value of resistors RA, RB, RC, RD, RE, RF, RG, RH shall be chosen such that the crowbar triggering voltage associated with IC6 and IC7 occurs at a voltage less than, or equal to Uo on the table shown on drawing 9491/9492/9493-ASSY Sheet 2 for the appropriate model.

iii. The value of resistors R37, R38, R39, R40, R41, R63, R64, R65, R66 and R67 shall be fitted in accordance with the table shown on drawing 9491/9492/9493-ASSY Sheet 2 for the appropriate model.

iv. Each active current limiting switch-off circuit associated with IC4 and IC5 shall be subjected to routine tests to establish that the current switch off occurs at a load current less than, or equal to, 505mA for model 9491-PS or 630mA for model 9492-PS-PLUS. (This is not applicable for Model 9493-PS-XXX).

**Conditions of Certification**

The following are conditions of certification

i. If the equipment is installed in a zone 2 hazardous area, it shall be housed in an enclosure that is coded Ex nA, Ex e, Ex d or Ex p, suitable for operating temperatures of -40ºC to +135ºC and providing an ingress protection of IP54 minimum. For some types of enclosure, additional certification will be required to permit the installation of the module within the enclosure. Reference should be made to the enclosure certificate. The installer shall ensure that the maximum ambient temperature of the module when installed is not exceeded.

ii. When the device is mounted in a zoned area, connection and disconnection of the modules input supply voltage while live is only permitted if the potentially explosive atmosphere is shown to be absent.